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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,479	09/24/2003	Steven G. Goebel	GP-303584	3973

7590 03/02/2007

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EXAMINER	
HODGE, ROBERT W	
ART UNIT	**PAPER NUMBER**
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/669,479	GOEBEL ET AL.	
	Examiner	Art Unit	
	Robert Hodge	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-36,38 and 40-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-36,38 and 40-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 1/3/07, with respect to the rejection(s) of claim(s) 13-22, 24, 26-28, 31, 32 and 41 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Pre-Grant Publication No. 2002/0004158.

Applicant's arguments with respect to the objection to claim 31 and the rejection of claims 35, 36, 38, 39 and 32 under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The objection of claim 31 and the rejection of claims 35, 36, 38, 39 and 32 under 35 U.S.C. 112, second paragraph have been withdrawn.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 13-36 and 40-45, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,544,681 hereinafter McLean in view of U.S. Pre-Grant Publication No. 2002/004158 hereinafter Suzuki.

McLean teaches a proton exchange membrane (PEM) type fuel cell system comprising a membrane electrode assembly (MEA) defining anode and cathodes sides, having a first flow field plate for the cathode side defined by first channels and lands, a second flow field plate for the anode defined by second channels and lands with the

MEA interposed between the first and second flow field plates, wherein the pitch of the first flow field plate is less than a pitch of the second flow field plate and said pitch defined by the second flow field plate is approximately twice as large as that defined by the first flow field plate, wherein a substantial number, majority and substantially all of the second lands have a cross sectional width wider than that of a substantial number, majority and substantially all of the first lands. McLean further teaches that the channels are either predominately straight or serpentine in orientation (abstract, figure 3, column 1, line 14 – column 2, line 36, column 3, line 60 – column 4, line 57, column 6, line 50 – column 8, line 42). The Examiner notes that figure 3 is only one of many bipolar plates that are provided within the fuel cell stack and therefore since channels 34 are for Hydrogen and 36 are for Oxygen a MEA would be present on both sides of the plate and subsequent plates would be stacked respectively against the MEAs thereby providing multiple plates as required by the instant claims.

McLean does not explicitly teach that the cross sectional width of the first channel is approximately equal to that of the second, or any specific dimensions found in the above listed claims or that further structure comprises structure defining a vehicle powered by the fuel cell or how the lands are oriented by angles and how the lands will contact on the surface of the MEA on adjacent sides.

Suzuki teaches a proton exchange membrane fuel cell for an automobile comprising membrane electrode assemblies which have two field flow plates having a plurality of channels wherein a substantial number, a majority and substantially all of the channel widths are approximately equal wherein the channels are designed to be varied

in shape and pattern, where the channels can be different sizes, and cross sectional areas that have the same specific dimensions as those claimed in the present application, as well as orienting lands in parallel planes at an angle from 0 to 90 degrees such that a land contact on both sides of the MEA is between 20% and 50% and the pitch of the channels can be varied (figures 3, 4 and 5 and paragraphs [0002], [0023]-[0026], [0056]-[0059], [0063], [0066]-[0070], [0078]-[0079] and [0084]). Suzuki also teaches many different formulae for optimizing all of the dimensions of the field flow plates as can be seen throughout the entire disclosure.

At the time of the invention it would have been obvious to one having ordinary skill in the art to include the features of the Suzuki reference in the McLean reference in order to provide a fuel cell that would be further optimized by reducing the size of the flow field plate and reduce the amount of material required to manufacture the plate, thereby allowing for a more compact design. As well as providing a fuel cell in a vehicle in order to replace the internal combustion engine that would in turn provide a vehicle that operates using clean energy and reducing pollutants released to the atmosphere. It would have also been obvious to one having ordinary skill in the art at the time the invention was made to optimize the field flow plates of McLean as taught by Suzuki since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art, in the absence of unexpected results. In re Boesch, 617 E.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over McLean in view of Suzuki as applied to claim 13 above, and further in view of U.S. Pre-Grant Publication No. 2001/0041281 hereinafter Wilkinson.

McLean as modified by Suzuki and discussed above is incorporated herein.

McLean does not explicitly teach a wiggle alignment pattern of alternating angles.

Wilkinson teaches a proton exchange membrane fuel cell for an automobile comprising membrane electrode assemblies which have two field flow plates having a plurality of channels wherein the channels are designed to be varied in shape and pattern, where the channels can be different sizes, and cross sectional areas that have the same specific dimensions as those claimed in the present application as well as having a sinusoidal shape (i.e. wiggle pattern) (abstract, figures 2d and 2e, paragraphs [0003], [0007], [0015], [0016], [0028]-[0030], [0035], [0036], [0041], and claims 6, 7 and 11).

At the time of the invention it would have been obvious to one having ordinary skill in the art to include the teaching of the Wilkinson reference in McLean as modified by Suzuki in order to provide varying serpentine patterns that would provide varying surface contacts that would thereby increase the efficiency of the fuel cell system.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RWH

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER